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Cover:
Mimulus shevockii with a potential pollinator, *Trichochrous* sp. (softwing flower beetle)

EDITORS' NOTES

We accepted the task of editing *Crossosoma* this winter, following Denise Knapp's six-year term in this role. We thank Denise for her excellent work and hope that we can maintain her standards.

As always, *Crossosoma* seeks to publish articles and short notes on all regional botanical topics, including floristic compilations, plant ecology, horticulture, anatomy, physiology, revegetation, rare plants, invasive plants, noteworthy collections, book reviews, and historical notes. We encourage submissions from academic, professional, and amateur authors. We sincerely believe that everyone interested in this field has some meaningful botanical observation or insight that warrants sharing. These bits of information are invaluable, yet they are at risk of permanent loss if they go unrecorded. We offer *Crossosoma* as a venue to pass them along. Please contact the editors to submit pieces for publication or to share ideas for possible articles.

Finally, we wish to acknowledge the contributions of 14 manuscript reviewers for their work on *Crossosoma* Volume 34 and their thoughtful effort on our behalf.

-Scott White and Michael Honer

EDITORIAL: A PLEA TO PROFESSIONALS

Historically, careers in botany were limited largely to academics and agricultural or pharmaceutical applications. Many other people practiced (and continue to practice) botany as an avocation rather than a career. In the United States, and especially in southern California, certain botanical subdisciplines offer a relatively new career path to botanists: documenting site-specific floras as baseline data for environmental impact analyses. This profession requires special expertise in floristics and ecological relationships. Like any profession, it requires a sound background and adherence to professional standards.

Yet professional botanists increasingly seem willing to rely on unverified online photographs to make the plant determinations that comprise their floristic projects. I recently reviewed a short botanical survey report in which the author cited CalFlora as a source for identifications, and reported *Streptanthus bernardinus* (CNPS List 4) on a project site. The report included a photograph of *Caulanthus major* (a locally common plant with no special status), mis-labeled as *S. bernardinus*. I looked up *S. bernardinus* on CalFlora and found a similar mislabeled photo. I believe that the report's author is unfamiliar with the local flora, did not make the effort to properly identify plants on the project site, and relied instead on unverified photographs.

Plant identifications are made by careful reference to the floristic literature and often by side-by-side comparison of vouchers with herbarium specimens. In southern California, we are fortunate to have several first-rate technical identification manuals; a variety of illustrated field guides; university libraries holding a body of published literature dating back hundreds of years; numerous publicly-accessible herbaria housing specimens identified and annotated by specialists; and access to leading plant systematists, by phone, mail, or email, or in person.

All of these sources have limitations. Keys contain errors or ambiguities; field guides are incomplete and provide only first-guesses at plant identifications; monographs may be out of date or difficult to find; herbarium specimens may be misidentified or may not represent the phenological state or geographic form of a given sample; experts may be unresponsive. As professionals, we must do our best to use these resources in any combination needed to identify our specimens. When the identity of a specimen may affect land use decisions, we must be tenacious in tracking down data needed for an accurate determination.

Illustrated field guides are the weakest of the resources listed above. They avoid technical detail and rely instead on superficial picture-matching and flower color.

Yet they are extremely useful to confirm or disconfirm tentative determinations, or to quickly seek similar plants at the level of family or genus. Good field guides (we have many for southern California) are written, illustrated, reviewed, and edited by experts. While they may contain some errors, these are scarce. Still, the effective use of a field guide necessitates an understanding of its strengths and weaknesses. As with any approach to plant determinations, effective field guide use requires an occasional skeptical step backwards, even when an identification is seemingly correct.

CalFlora is an online field guide written, illustrated, and edited by volunteers. It has the strengths and weaknesses of any volunteer project. As a volunteer online resource, it is comparable to Wikipedia. It is a fine resource for casual overview. But neither CalFlora nor Wikipedia meet standards for stand-alone professional research. None of us would trust a surgeon or airline pilot who used Wikipedia alone to diagnose medical conditions or flight anomalies.

CalFlora offers many photographs, some of them verified, some not. Some of the photographs are remarkable. Others are simply wrong. Used alone, it is not a reliable resource. Used carefully, with an understanding its strengths and weaknesses, and with an occasional step backwards, CalFlora can be extremely useful.

- *Scott D. White*

DEDICATION

Oscar F. Clarke

Oscar F. Clarke is a lifelong naturalist, the first curator of the UC Riverside Herbarium, and an important mentor to numerous botanists and naturalists in southern California. He is the principal author of *Flora of the Santa Ana River and Environs* (Heyday Press 2007), a user-friendly and botanically sound work that sets a standard for botanical field guides.

Oscar was born in Colton, California in 1919. As a pre-teen, he was interested in insects, perhaps due to myopia which limited his vision at distance yet allowed him to focus closely on fine detail. The Clarke family struggled through the Great Depression, during Oscar's teenage years. Their troubles were compounded by the death of his father when Oscar was only 13. Beyond high school, Oscar had

Oscar Clarke at Edmund Yeager's "Palaver," c. 1960s

limited formal education. As a young man, he attended San Bernardino Valley Junior College but he learned biology mainly from various mentors and from self-guided study at the Colton Public Library. His early focus on small insects and their smaller structures has continued throughout his life and links to his work with plants. He has always emphasized the importance of small details of plant structure in recognizing relationships among species and populations.

Wilson C. Hanna (1883-1982) was a neighbor and an early mentor to Oscar. Hanna was a chemist for the Colton Portland Cement Company by vocation, but an avid amateur ornithologist and oologist (egg collector) by avocation. Hanna was a major figure in Southern California ornithology in the first half of the 20th century. A great deal of what we know today about bird biology in the field (e.g., clutch sizes, nesting dates, nest parasitism, and historic breeding distributions) is based on the work of the old-time egg collectors (see W.L. Dawson's masterful "*The Birds of California*" [South Moulton Co., 1923] as an example of the oologists' contributions). Hanna's well-documented egg and nest collections are an important baseline for modern ornithology and conservation biology, representing a major part of the historical record of the local avifauna. As a teenager, Oscar helped Hanna with his egg collections, particularly serving as his tree climber, but also building and installing nest boxes for cavity-nesting species, and processing the eggs as they arrived from the field. Fresh eggs had to be drilled, their contents drained, and labeled with a fine brush, in ink, with the species' American Ornithologists Union checklist number and number of eggs in the original set. Oscar worked at this processing in the evenings after school. He developed an early interest in botany as he studied the plant materials from which various birds made their nests. Hanna's egg specimens now comprise the bulk of the San Bernardino County Museum's oology collection, the 5th largest such collection in the world. The Museum's collection was curated through the 1990s by another of Hanna's informal students, Oscar's friend and younger contemporary, Eugene A. Cardiff.

Edmund Jaeger (1887-1983) was another important early mentor, who Oscar met when Jaeger brought some bird specimens to Hanna for identification. Jaeger was a charismatic naturalist, best known for his books on natural history of the California deserts and for the annual "Palavers" (field trip/seminar/camp-outs) he organized, and which continue to the present. Oscar participated in many Palavers, frequently as a keynote naturalist or as leader for botanical activities. Jaeger introduced Oscar to Dr. Howard Fawcett (1877-1948), plant pathology professor at the University of California's Citrus Experiment Station in Riverside (which became UCR in 1954), who hired Oscar as a lab technician in 1941. Among many other tasks, he worked with the botanical collection Fawcett had assembled to aid in plant identification for the Station's research work. Oscar's work at UCR was interrupted within a year when he was drafted into the US Army where he served in the Medical Corps from 1942-1946. While in the army, stationed in Medford, Oregon, he met and married Joanne Riesch (1919-1996), a teacher. The couple had four children.

Oscar returned to the Citrus Experiment Station in 1946, again working as a

technician in the Plant Pathology Department. Beginning in the late 1940s, he worked under Dr. Richard Baines (1905-1979), researching parasitic nematodes that damaged regional citrus production. He discovered a new nematode, *Haplolaimus clarkeae*, named in his honor. He also became known as the Experiment Station's unofficial botanist, routinely answering the public's questions about plants. During this period he guided Dr. Carl Epling of UCLA, the expert on taxonomy of the mint family, to sites on the Experiment Station grounds where *Salvia apiana* and *S. mellifera* hybrids were found. Also about this time he published his first paper – on the identification of *Amaranthus* (pigweed) in southern California orchards. In 1966 Professor Frank C. Vasek selected Oscar to manage and improve the small Biology Department herbarium. Dr. Vasek had begun the herbarium in about 1956, shortly after his arrival at UCR, but it was staffed only part time by students. Oscar lacked a university education but was the recognized expert in the local flora and thus became the herbarium's first paid curator. Dr. Vasek himself is best known for his work on *Clarkia* evolution, juniper taxonomy, and the discovery of the ancient creosote rings of the Mojave Desert.

As the herbarium curator, Oscar first began to think of himself as a professional botanist. He became an expert on agricultural weeds; he gave public lectures and classes on horticulture and wild edible plants; and collected specimens for the herbarium and for botany courses. He curated the herbarium from 1966-1979, when he retired. He increased the size of the UCR Herbarium by some 10,000 specimens from all over the world but especially from southern California. In the 1970s he was a familiar figure around the UCR campus and especially the Biology Department, where he often was seen running, carrying bundled plant material for botany classes. In the late 1960s and through the 1970s he led or participated in several botanical trips to Mexico, beginning in 1967 with a trip to Chiapas, accompanying Earl Lathrop, Professor of Plant Ecology at Loma Linda University and Robert Thorne of Rancho Santa Ana Botanical Garden. Oscar collected over 850 specimens in Mexico under his own name, and assisted others (e.g., Thorne, A. Sanders, A. Gomez-Pompa, and others) with the collection of many more. He has had a long interest in both weeds and cultivated plants and has made specimens of nearly a thousand plants in each category.

Among Oscar's important collections was the first, and still only, specimen of *Helianthella durangensis* Turner, a plant he found in the mountains of Durango, Mexico in 1969. On the same trip he rediscovered *Trichocoryne connata*, a species that had not been seen since it was described from an unknown locality somewhere in the state of Durango in the late 1800s.

Oscar knew many of the active botanists in southern California during the 20th century, including Peter Raven, Phil Munz, Robert Thorne, Dennis Breedlove, Mildred Mathias, Annetta Carter, Dieter Wilken, Carl Epling, John B. Feudge, Dave Verity, and many others. Oscar knew Munz well and periodically took specimens to him for identification. He remembers that when he was still fairly inexperienced in the ways of botanists, probably in the mid 1950s shortly after he'd first met Munz, he took a large bouquet of wildflowers to RSA for help with identifications. Munz patiently but pointedly explained that those who work in herbaria prefer to identify pressed specimens.

Oscar is well known for his iconoclastic independence and wide-ranging interests. Coming of age during the Depression, he decided to be as self-sufficient as possible. In about 1947, with help from friends and hired labor, he constructed his own large house, including a full basement, on Spruce St. in Riverside. Over the years he learned to build and repair things, make use of cast-off materials, grow his own food, and keep bees, among many other skills and avocations. For years he kept a milk cow on the back "pasture" behind the Spruce St. house. At a recent 90th birthday celebration, his children recalled their unconventional childhoods, growing corn instead of lawn in the front yard and riding in a then unheard-of VW microbus. It was an economical and utilitarian substitute for Detroit's typical family car of the day, but an embarrassment to the socially-conscious teens.

Since his retirement in 1979, Oscar has traveled and collected plants in many countries around the world, including 3 months in Europe and Africa in 1982-83 (particularly in Kenya and South Africa), 12 months traveling throughout Australia in 1986-87, 6 months traveling in the U.S. and Canada in 1989-90, and 6 months in Chile and Argentina in 1990-91. Most recently Oscar and his second wife Marsia Alexander-Clarke visited Thailand with Greg Ballmer of the UCR Entomology Dept. in 1998. These travels have sustained Oscar's interest and enjoyment of botany and generated a great many specimens for study by others. The trip to Chile and Argentina alone produced over 740 plant collections, plus many duplicates. The first set of these South American collections is housed in the UCR Herbarium that Oscar ran for so many years. His African and Australian collections are mostly at the Rancho Santa Ana Botanical Garden Herbarium in Claremont.

Also following his retirement, Oscar purchased a large parcel of rough and rocky land near Bisbee, Arizona on which he constructed a small campsite and which he used for a number of years as botanical field station. He subsequently conveyed it to a conservation organization and it is now a nature reserve. Many collections were made from this site in the 1980s.

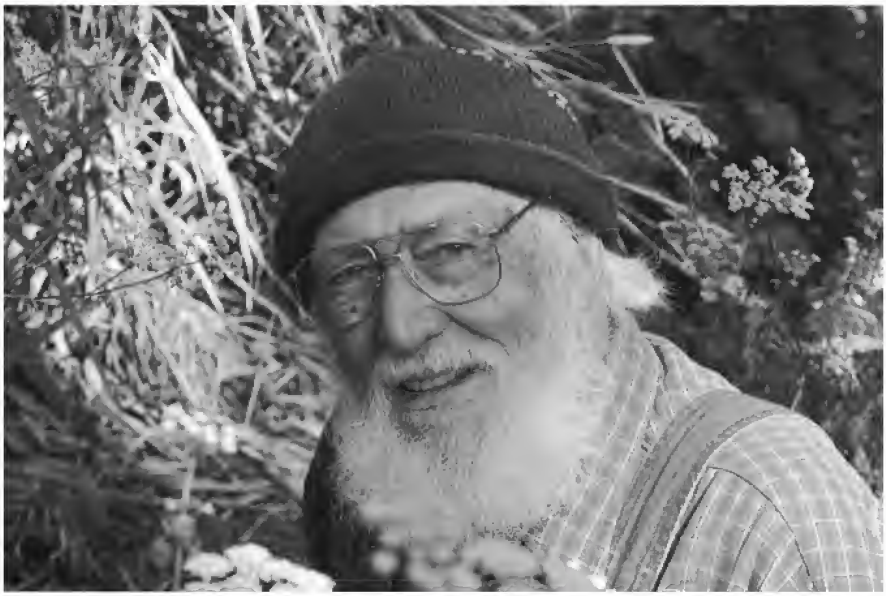
Besides his work with museum specimen collection, Oscar has long had an even greater interest in living collections and gardens. His own yard has always been a sort of living collection of any and all plants that caught his attention, including odd or unusual weeds. For decades he has routinely gathered seeds and other propagules of anything new or unusual that he saw on his travels in California or beyond.

He has long practiced horticultural selection in the old-fashioned manner – growing numerous seedlings, or tolerating volunteers, and then rogueing out all but the best few. By this means he developed two noteworthy varieties, one unfortunately now lost. The lost variety was a peach he called "Thanksgiving" because of its extraordinarily late time of ripening – when few other peaches are available locally. It was selected out of the progeny of "Miller's Late" but unfortunately was infected with a virus to which it was resistant, but which made grafting impossible because its infected scions killed the rootstocks they were grafted to. Advanced tissue culture propagation techniques were considered, but never done.

More successful was a mulberry now called the "Oscar" which is considered superior in flavor and which is both in (limited) commercial production as fresh fruit and in the nursery trade for home production. See for example: *http://www.raintreenursery.com/catalog/productdetails.cfm?ProductID=D430*

Throughout his career and his retirement, Oscar has been a mentor to younger botanists and naturalists. Charlotte Bringle Clarke (no relation) dedicated her book, *Edible and Useful Plants of California* (UC Press 1977) to him. Charlotte was a participant on two of Oscar's trips to Mexico in 1967, along with Fred B. Essig, who is now a professor of Botany in Florida and an expert on palms and *Clematis*. Margriet Wetherwax (now of the UC Berkeley Herbarium) got her start by learning from Oscar when she was a student at UCR. Likewise, Andrew Sanders, who has run the UCR Herbarium since Oscar retired, was greatly influenced by Oscar both as a student and in the beginning of his curatorial days. And several thousand people have participated in UC Extension natural history classes, Sierra Club Nature Knowledge Workshops, Jaeger Palavers, CNPS Field Trips and other activities led by Oscar.

At 90 Oscar is still actively involved with botany and horticulture and has not stopped his explorations of plants, especially those in his diverse garden. His international travels seem to have ended, but he still "travels widely in New Haven," following the practice of Thoreau in continuing to investigate his own neighborhood.



Southern California Botanists dedicates *Crossosoma* Volume 34 to Oscar F. Clarke in recognition of his role as an author and mentor to many and indirect mentor to many more.

-Contributed by Andrew C. Sanders, Gina Richmond, and Scott D. White.

CONSERVATION STATUS OF *MIMULUS SHEVOCKII* HECKARD & BACIG. (PHRYMACEAE)

Naomi S. Fraga
Rancho Santa Ana Botanic Garden and Claremont Graduate University
1500 N. College Avenue, Claremont, California 91711
naomi.fraga@cgu.edu

ABSTRACT: *Mimulus shevockii* is a minute annual herb endemic to Kern County, California. Several disturbance factors threaten it, including housing development, cattle grazing, and off road vehicle activity. Additionally, at least one population may have been extirpated when Lake Isabella was filled in 1953. This review reports two new occurrences and reevaluates conservation strategies recommended in an earlier Conservation Plan (Fraga 2007).

KEYWORDS: Kern County, *Mimulus*, *Mimulus shevockii*, Mojave Desert, Phrymaceae, rare plants, southern Sierra Nevada.

Figure 1. Growth habit of *Mimulus shevockii* shown with a toothpick and finger for scale.

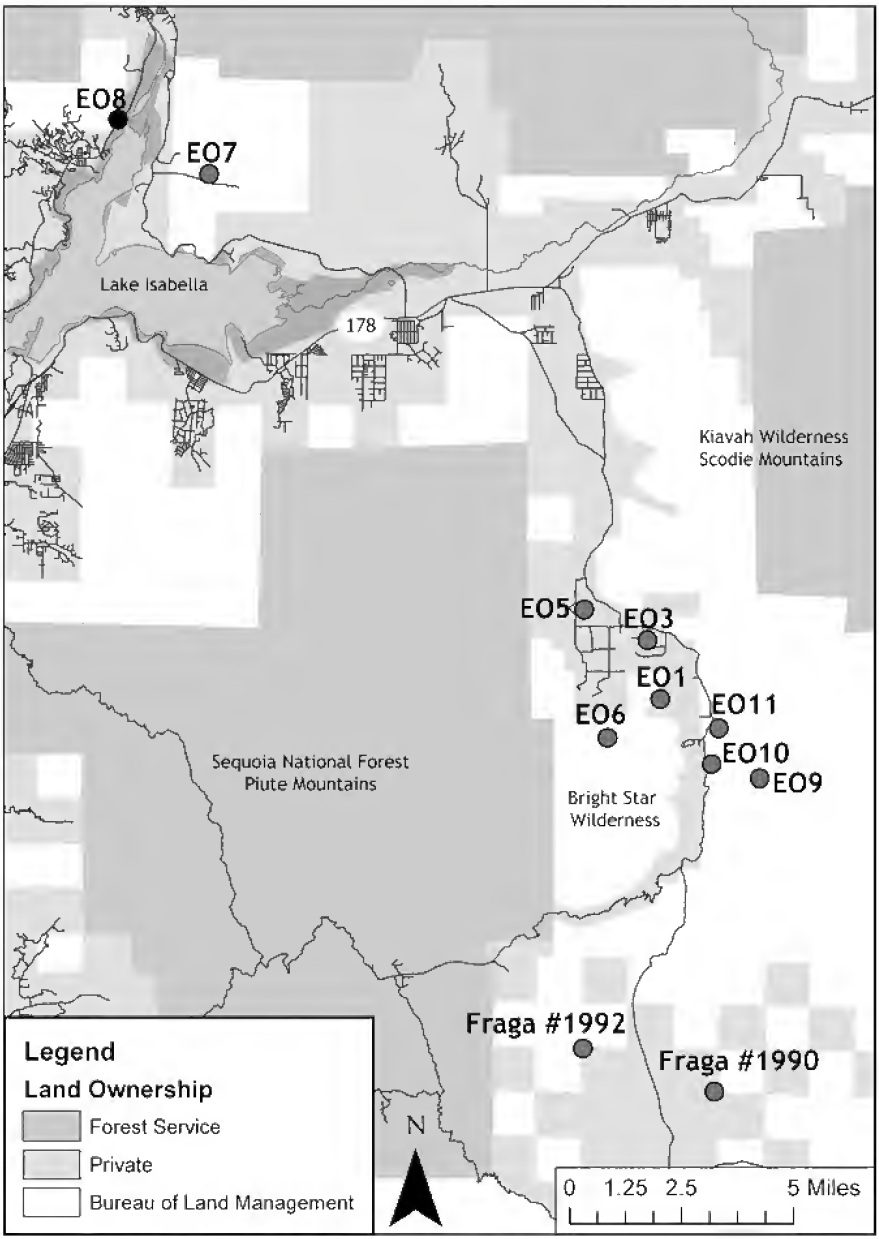


Figure 2. Distribution of *Mimulus shevockii*. Element occurrence (EO) numbers are indicated adjacent to points (CNDDB 2009). EO8 may be extirpated. All extant occurrences have been recently verified by Fraga (created with ESRI® ArcMap™ 9.1).

INTRODUCTION

Mimulus shevockii Heckard & Bacig. (Phrymaceae, formerly placed in Scrophulariaceae) is a diminutive winter annual (Fig.1) commonly known as the Kelso Creek monkeyflower that was described by Heckard & Bacigalupi (1986). It has a narrow distribution; it is limited to a 70 sq mi region in the southern Sierra Nevada in Kern County, California. I became acquainted with *M. shevockii* while working on my master's degree at Rancho Santa Ana Botanic Garden. As a part of the Garden's graduate curriculum, I took a course on plant conservation planning. As part of the course, students conduct research and write a comprehensive document for a selected rare plant species in California. I chose to work on *M. shevockii*, an ideal candidate due to its limited distribution and known threats to its long-term survival. My conservation plan for *M. shevockii* (Fraga 2007) synthesized all available data as of 2007 including biological and ecological information, documents threats, and outlines conservation goals and objectives. Since publication, much has been learned about *M. shevockii,* providing insight into possible conservation actions that should be taken. Here I review the status of *M. shevockii*, update knowledge on its distribution, and provide conservation recommendations based on current information.

CONSERVATION STATUS

Mimulus shevockii is known from ten extant occurrences and possibly one extirpated occurrence (Fig. 2) (California Natural Diversity Database 2009). It is not listed as threatened or endangered under California or Federal Endangered Species Acts. It is on the California Native Plant Society's List of rare plants as 1B.2, i.e., it is "fairly endangered" in California and meets the requirements for listing under the California Endangered Species Act (CNPS 2009). The Bureau of Land Management (BLM) manages *M. shevockii* as a sensitive plant, designating it for special management consideration. The California Department of Fish and Game has designated *M. shevockii* as a special plant, and is therefore inventoried by the California Natural Diversity Database (CNDDB 2009). In addition, the Natural Diversity Data Base assigns *M. shevockii* a Global Ranking of G1 and a State Ranking of S1.2, indicating that its distribution and numbers are very limited and that the taxon is threatened (CDFG 2008). *M. shevockii* was proposed for federal listing as endangered (USFWS 1994). However, the proposal was withdrawn, in part due to the paucity of available information available on the species range, and the determination that threats to warrant listing had not been identified (USFWS 1998). There is currently no federal status for *M. shevockii.* The creation of Lake Isabella may have caused extirpation of one historic *Mimulus shevockii* occurrence. Bangsberg collected *M. shevockii* in 1932 at "Kernville."

That locality is too vague to attribute the specimen to known occurrences, such as nearby Cyrus Canyon, or an otherwise undocumented locality that may have been inundated by Lake Isabella, or eliminated by surrounding land development. The occurrence is reported as EO 8 in the CNDDB (2009).

Newly documented occurrences

In 2008, two previously unknown *Mimulus shevockii* occurrences were documented (*Fraga 1990 & Fraga 1992*; to be deposited at RSA). These occurrences extend the range of *M. shevockii* seven miles to the south. Both are on private property adjacent to BLM land managed by the Ridgecrest Office (Fig. 2). Cattle grazing and off road vehicle use are threats to these newly documented occurrences. There are several areas that have been identified as potential habitat in the Kelso Valley region, and it is likely that additional populations are awaiting detection (Fraga 2007).

Threats

Mimulus shevockii occurrences are threatened or potentially threatened by several factors. These include land use conversions for agriculture and development of homes; cattle grazing, off road vehicle use, presence and abundance of invasive exotic plant species, and road maintenance. At least one of these threats has been documented at all known *M. shevockii* occurrences. One occurrence documented by Bangsberg in 1932 (*Bangsburg s.n., 17 Apr 1932*), may have been extirpated due to the creation of Lake Isabella in 1953.

CONSERVATION RECOMMENDATIONS

Recommendations outlined in the conservation plan (Fraga 2007) include: 1) Maintain all existing occurrences. 2) Preserve existing habitat of *M. shevockii*. 3) Limit impacts from disturbance (e.g., residential development, OHV use, and cattle grazing). 4) Establish an ex-situ maternal line seed collection(s). 5) Survey additional areas with potential habitat for additional occurrences. 6) Assess the genetic diversity of the species to identify meta–population dynamics. 7) Identify any specific research needs at each occurrence. Additional conservation recommendations are provided below.

Mimulus shevockii is vulnerable to local extirpation due to several underlying factors. Abundance of individual plants and areas and numbers of sites they occupy vary widely from year to year, presumably due to fluctuations in rainfall and other climatic variables. Thus, it is difficult to assess population size and

extent, except during the best years. Surveys for presence/absence of *M. shevockii* should only be undertaken when *M. shevockii* can be reliably found by field botanists, as confirmed by visiting known reference locations. Surveys conducted in poor years, or out of season, may lead to a false conclusion that *M. shevockii* is absent from a given project site. Land use decisions and subsequent development based on such surveys could lead to extirpation of undocumented *M. shevockii* occurrences.

The majority of *Mimulus shevockii*'s known occurrences are within ca. one mile of each other, in Kelso Creek Valley (Fraga 2007). Prior to development within the Kelso Creek Valley region, gene flow may have been frequent between proximal populations. *Mimulus shevockii* is likely pollinated by small insects that travel relatively short distances. Small soft wing flower beetles (*Trichochrous*) have been observed visiting flowers. The flight path of small insects such as *Trichochrous* may be impeded by the construction of roads and houses among populations. Habitat fragmentation may therefore be inhibiting gene flow, leaving populations isolated and vulnerable to genetic impoverishment. However, little is known regarding inter-population pollinator movements, and flight capabilities remain poorly understood for most pollinators (Pasquet et al. 2008).

About half of the known occurrences of *M. shevockii* are found wholly or partly on private property; these occurrences are at greatest risk due to potential development or other land use changes. Several populations have been fragmented due to their proximity to developed areas. One large population (in terms of area of occupancy and number of individuals; EO3) occupies an area entirely on private property that is proposed for development of homes (CNDDB 2009, Fraga 2007).

When the conservation plan (Fraga 2007) was published, it made no recommendations to list this species as threatened or endangered under California or Federal Endangered Species Acts. In fact, it suggested that listing should only be considered after further investigation. Upon conducting additional field work, and reviewing land ownership patterns and threats, additional conservation measures seem necessary. I recommend that State and federal listing be considered to aid in conservation of this species, and that efforts to list *M. shevockii* under the California Endangered Species Act be prioritized due to threats to its occurrences on private property. Currently BLM is managing for this species in a manner that would not likely change appreciably under Federal listing.

FUTURE DIRECTIONS

Through my dissertation research at Rancho Santa Ana Botanic Garden, I hope to learn more about *M. shevockii* to aid in its conservation. My research objectives are to characterize gene flow (pollen and seed movement) among populations, genetic diversity, and population genetic structure. Surveys of known populations and potential habitat will continue with the goal of better understanding *M. shevockii's* population dynamics and distribution. In addition, pollinator observations, and seed banking efforts will continue. A detailed understanding of this species' population biology will inform future conservation actions.

ACKNOWLEDGEMENTS

I wish to thank Duncan Bell, Bimme Kean, Denis Kearns, and Tim Thomas for assistance and useful discussion; Shelley Ellis, and Allison Sheehey, provided location information for the two newly documented localities; Elizabeth Friar, Steve Boyd, Lucinda McDade, and Gary Wallace who have provided guidance throughout the project; Scott White and two anonymous reviewers who greatly enhanced this manuscript, and Southern California Botanists, California Native Plant Society, and the National Fish and Wildlife Foundation who provided funding.

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THE LICHENS ON SAN MIGUEL ISLAND, CHANNEL ISLANDS NATIONAL PARK, CALIFORNIA: A PRELIMINARY CHECKLIST.

Kerry Knudsen
The Herbarium, Department of Botany & Plant Sciences,
University of California,
Riverside, CA 92521-0124.
kk999@msn.com

ABSTRACT: 141 lichens are reported from San Miguel Island, Channel Islands National Park, Santa Barbara County, California.

KEYWORDS: Biological crusts, caliche, calcareous lichens, *Dudleya*, grazing, terricolous lichens.

INTRODUCTION

San Miguel Island in Channel Islands National Park is the most northern and westerly of the Channel Islands. It is about 10 km (6 miles) long with a total area of 34 km (14 square miles). The island is a plateau with two rounded hills, Green Mountain and San Miguel Hill, rising to 244 m (800 feet) in the center. Dense fog and strong winds are frequent. The average temperature is a cool 14° C (59° F) though rarely temperatures can reach 32° C (90° F) (Schoenherr et al. 1999). San Miguel was heavily impacted by sheep ranching, which started in the 1850s, though the island has had over forty years to recover since the last animals were exterminated in 1966 (Roberts 1991). San Miguel probably once supported island chaparral, maybe even *Quercus pacifica* based on the lichens found there, but the dominant shrub is *Baccharis pilularis* now. There are large areas of grassland and dunes. Caliche is plentiful, supporting many calcareous lichens, and there are deposits of volcanic rock and dacite on the island (Weigand 1998). Harris Point, Lester Point, and lower Willow Canyon support diverse communities of maritime lichens.

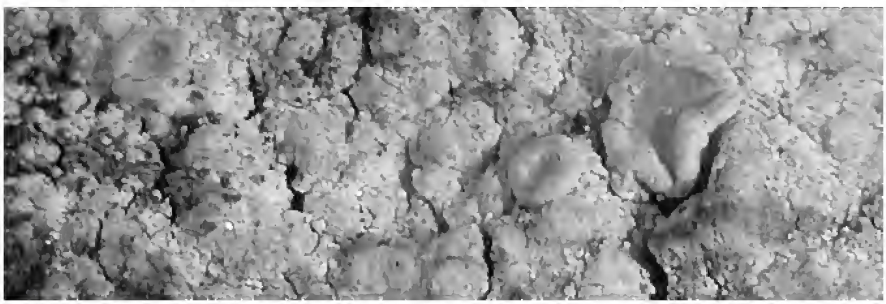
My survey of the lichens lasted seven days in June, 2006, and concentrated mainly on sites from Green Mountain to Caldwell Point and lower Willow Canyon. I did not attempt to cover the whole island. The surveys were qualitative and intuitive and concentrated on species diversity rather than distribution. Collections by the author are deposited in the University of California Riverside Herbarium (UCR). More detailed information is available online (http://sanders5.ucr.edu/lichensflatindex.php). I spent three days at the Arizona State University Lichen Herbarium (ASU) examining San Miguel Island collections made by Janet Marsh

in June, 1995 and by Thomas H. Nash in March, 1998. In the Lichen Herbarium at the Santa Barbara Botanical Garden (SBBG), I examined and revised a small selection of Charis Bratt's collections from San Miguel Island of species not collected by Nash, Marsh, or myself and the verified material is included in the checklist presented here. Bratt did not collect extensively on San Miguel Island, although she made several visits. Overall, the collections from the Channel Islands at SBBG have been poorly annotated, with many mis-determinations, and often have outdated names that need to be revised. This task extends far beyond what I had funds to achieve during this study but should be undertaken in the future because it is especially important for the study of the lichen flora of Santa Cruz Island where Bratt collected extensively.

The checklist presented here is preliminary and will be revised as a lichen flora of Channel Islands National Park is developed. As a general rule I have excluded any previous reports of species that have not been published in the three volumes of the *Lichen Flora of the Greater Sonoran Desert Region* (Nash et al. 2002, 2004, 2007) because the identifications based on out-dated taxomomy are unreliable. I only include them when earlier reports have been confirmed in recent scientific literature or where I have personally confirmed them.

Lichenicolous fungi have not been extensively collected or studied on San Miguel Island. A few species are mentioned under their main hosts.

Corticolous lichens occur on bark or wood, even fence posts, and can be specific to certain vascular genera. Saxicolous lichens occur on various rock substrates and some species specifically occur on calcareous or acidic substrates. Terricolous lichens occur on soil. More information can be found on most species in the three volumes of the *Lichen Flora of the Greater Sonoran Desert Region* which has excellent coverage of the Channel Islands (Nash 2002, 2004, 2007) or in the cited literature.



Lecanora carneolutescens on San Miguel Island. Photo: J. C. Lendemer

PRELIMINNARY CHECKLIST OF THE LICHENS OF SAN MIGUEL ISLAND

Acarospora socialis H. Magn. – Saxicolous. Green Mountain, Marsh 8047, Nash 41383 (ASU); Devil's Knoll, Marsh 7880 (ASU).

Adelolecia sonorae Hertel – Saxicolous. Hertel (2004) described this new species from two specimens. The holotype was from Baja California. The paratype was collected by Nash on Green Mountain. The types could not be located and may be lost or misfiled at ASU or have not been returned by Hertel. I did not collect any specimens of *A. sonorae*. But I have collected it on Santa Rosa Island on the bluff between Lobos Canyon and Cow Canyon.

Bacidia coruscans S. Ekman – Corticolous. On dead trunk of *Coreopsis gigantea*, trail to Lester Point, Knudsen 6810 (UCR). Type locality is the sand dunes of the east end where it was collected on the dead stems of *Lupinus albifrons*.

Bacidina californica S. Ekman – Corticolous. Green Mountain, Knudsen 6798, 6694.2. (UCR).

Bacidina ramea S. Ekman – Corticolous. Nidever Canyon, Bratt 9030 (SBBG).

Buellia species – Terricolous. Cuyler Harbor, Knudsen 6895 (UCR). Undescribed terricolous taxon (see Bungatrtz et al. 2007) listed as *Buellia* species 2 and reported from two Nash collections from Santa Rosa Island. More collections are needed of this taxon before it can be described. It would have been a component of calcareous biological soil crusts.

Buellia alboatra (Hoffm.) Th. Fr. – Usually Saxicolous. Green Mountain, Knudsen 6678 (UCR), Nash 41226 (ASU); Cuyler Harbor, Knudsen 6892 (UCR); side canyon SE of Willow Canyon, Nash 41302 (ASU); the Gangplank, Nash 41097 (ASU); along trail to Harris Point, Nash 41125 (ASU).

Buellia capitis-regum W.A. Weber – Saxicolous. Green Mountain Nash 41226 (ASU), Marsh 7981 (ASU) ; side canyon SE of Willow Canyon, Nash 41252 (ASU); lower Willow Canyon, Nash 41321 (ASU); Harris Point, Nash 41156 (ASU); Lester Point, Nash 41134; Marsh 7921, 7911, 7918 (ASU).

Buellia christophii Bungartz – Saxicolous. Harris Point, Nash 41181, 41174 (ASU).

Buellia halonia (Ach) Tuck. – Saxicolous. Slope near Fish, Knudsen 6930 (UCR); lower Willow Canyon, Nash 41322 (ASU); along ridge crest of ridge extending W of Green Mountain, Nash 41246, 41434 (ASU); side canyon of Willow Canyon, Nash 41253 (ASU).

Buellia oidalea (Nyl.) Tuck. – Corticolous. Campground area below ranger's station, Nash 41118, 42085 (ASU); Green Mountain, Nash 41356, 41366 (ASU).

Buellia maritima (A. Massal.) Bagl. – Saxicolous. Willow Canyon, Knudsen 6955.2, 6957, 6965 (UCR), Nash 41272 (ASU); between Caldwell Point and Willow Canyon, Knudsen 6901 (UCR); Green Mountain, Knudsen 6784 (UCR), Nash 41222, 41398, 41201 (ASU); lower end of Willow Canyon, Nash 41323, 41294 (ASU); Lester Point, Nash 41137A (ASU); the Gangplank, Nash 41092, 41100 (ASU); top of bluff E side of Willow Canyon, Nash 41270 (ASU); along trail to Harris Point, Nash 41126 (ASU); E end of Cardwell Point, Marsh 8002 (ASU).

Buellia prospersa (Nyl.) Riddle – Saxicolous. Lower part of Willow Canyon, Nash 41312 (ASU).

Buellia pullata Tuck. – Saxicolous. Willow Canyon, Knudsen 6956 (UCR); west of trail to Caldwell Point, Knudsen 6742 (UCR); the Gangplank, Nash 41099 (ASU); Green Mountain, Nash 41249, 41227 (ASU); lower part of Willow Canyon, Nash 41311, 41314 (ASU).

Buellia punctata (Hoffm.) A. Massal. – Corticolous. Slope above SE beach, Nash 41101 (ASU).

Buellia ryanii Bungartz – Saxicolous. Upper Willow Canyon, Knudsen 6952 (UCR).

Buellia sequax (Nyl.) Zahlbr. – Saxicolous. Willow Canyon, Knudsen 6810.2 (UCR); Green Mountain, Nash 41423, 41392 (ASU).

Buellia tesserata Körb. – Saxicolous. Lower Willow Canyon, Nash 41327B (ASU).

Buellia venusta (Körb.) Lettau – Saxicolous. Green Mountain, Knudsen 6800 (UCR); San Miguel Hill, Nash 41185 (ASU); China Point, Nash 41214 (ASU).

Caloplaca bolacina (Tuck.) Herre – Saxicolous. Willow Canyon, Knudsen 6810.3, 6958 (UCR); lower Willow Canyon, Nash 41296, 41298, 41324 (ASU); Harris Point, Nash 41157, 41123 (ASU); Lester Point, Nash 41135 (ASU); Bay Point, Nash 41344 (SU); Green Mountain, Nash 41394, 41384, 41199, 41228 (ASU); San Miguel Hill, Marsh 7942 (ASU); the Gangplank, Nash 41093 (ASU). The lichenicolous fungus *Stigmidium epistigmellum* (Nyl. ex Vouaux) Kocourk. & K. Knudsen is often found on the apothecia and thallus of this species as well as on *C. ludificans*, *C. luteominia* var. *luteominia*, and *C. rosei* (Kocourková and Knudsen 2009) as well as on West Anacapa Island on *C. impolita* (pers. comm., Kocourková).

Caloplaca brattiae W.A. Weber – Saxicolous. Lower Willow Canyon, Nash 41325, 41297 (ASU).

Caloplaca coralloides (Tuck.) Hulting – Saxicolous. Harris Point, Nash 41158 (ASU); Lester Point, Marsh 7913 (ASU); Bay Point, Nash 41345 (ASU); seashore rocks within Willow Canyon, Nash 41342 (ASU); Willow Canyon, Marsh 8026 (ASU); Cardwell Point, Marsh 8010 (ASU).

Caloplaca holocarpa (Hoffm. ex Ach.) A.E. Wade – Corticolous. Lower Willow Canyon, Nash 41291 (ASU).

Caloplaca ludificans Arup – Saxicolous. San Miguel Hill, Knudsen 6783 (UCR); Caliche Forest, Marsh 7952 (ASU).

Caloplaca luteominia (Tuck.) Zahlbr. – Saxicolous. San Miguel Hill, Knudsen 6784 (UCR), Nash 41184 (ASU); Green Mountain, Knudsen 6677 (UCR).

Caloplaca marina (Wedd.) Zahlbr. ***ssp. americana*** Arup – Saxicolous. Harris Point, Nash 41124 (ASU); Green Mountain, Nash 41221 (ASU).

Caloplaca marmorata (Bagl.) Jatta – Saxicolous. Green Mountain, Knudsen 6767 (UCR); Caliche Forest, Marsh 7955 (ASU).

Caloplaca rosei Hasse – Saxicolous. Bay Point, Nash 41346 (ASU); lower Willow Canyon, Nash 41326 (ASU); Harris Point, Nash 41159 (ASU).

Caloplaca stanfordensis H. Magn. – Corticolous. Lower Willow Canyon, Nash 41286 (ASU).

Caloplaca stantonii W.A. Weber ex Arup – Saxicolous. Near Nidever Canyon,

Marsh 8044 (ASU); China Point, Nash 41208 (ASU).

Caloplaca stipitata Wetm. – Corticolous. Cuyler Harbor, Knudsen 6893 (UCR); Green Mountain, Knudsen 6785.2, 6686 (UCR), Nash 41435, 41396A, 41395 (ASU); San Miguel Hill, Knudsen 6761 (UCR); side canyon SE of Willow Canyon, Nash 41250, 41255, 41254 (ASU); the Gangplank, Nash 41082 (ASU); Devil's Knoll, Marsh 7906 (ASU); China Point, Nash 41212 (ASU). This species was originally described from San Miguel Island.

Candelariella aurella (Hoffm.) Zahlbr. – Usually saxicolous, sometimes on wood. Green Mountain, Knudsen 6791.3 (UCR), Nash 41220 (ASU); China Point, Nash 41213 (ASU).

Candelariella vitellina (Hoffm.) Müll. Arg. – Saxicolous. San Miguel Hill, Nash 42081 (ASU).

Candelariella xanthostigma (Ach.) Lettau – Corticolous. Green Mountain. Nash 41358, 41467 (ASU); slope above SE beach, Nash 41102 (ASU); the Gangplank, Nash 41083 (ASU).

Chrysothrix candelaris (L.) J.R. Laundon – Corticolous. Green Mountain, Nash 41359 (ASU).

Chrysothrix granulosa G. Thor – Corticolous. Unknown location, Marsh 7937 (ASU).

Cladonia nashii Ahti – Terricolous. One site on slope of Willow Canyon, Knudsen 6944, 6945(UCR).

Cliostomum griffithii (Sm.) Coppins – Corticolous. Green Mountain, Nash 41360 (ASU);

Collema coccophorum Tuck. – Terricolous. Green Mountain, Knudsen 6759, 6691 (UCR).

Collema cristatum (L.) F. H. Wigg. – Terricolous. Upper Willow Canyon, Knudsen 6940 (UCR); lower part of Willow Canyon, Nash 41299 (ASU).

Dendrographa leucophaea (Tuck.) Darb. – Corticolous, saxicolous. Cuyler Harbor, Knudsen 6896 (UCR); Green Mountain, Nash 41397, 41328 (ASU); Lester Point, Nash 41149, 41139 (ASU); Willow Canyon, Nash 41255 (ASU);

Harris Point, Nash 41160 (ASU); Bay Point, Nash 41348 (ASU).

Dimelaena californica (H. Magn.) Sheard – Parasitic, saxicolous. Green Mountain, Nash 41229 (ASU).

Dimelaena radiata (Tuck.) Müll. Arg. – Saxicolous. Lester Point, Nash 41137B, 41136 (ASU); Green Mountain, Nash 41461, 41396, 41401, 41230 (ASU); lower end of Willow Canyon, Nash 41327A (ASU); Willow Canyon, Nash 41256 (ASU); Harris Point, Nash 41175 (ASU); Devil's Knoll, Marsh 7879 (ASU); the Gangplank, Nash 41094 (ASU).

Dimelaena weberi Sheard – Saxicolous. The Gangplank, Nash 41095 (ASU). The specimen is poor and I am not entirely convinced about the determination but it is a rare species expected on the Channel Islands.

Diploicia canescens (Dickson) A. Massal. – Corticolous. Green Mountain, Knudsen 6750, 6694.1 (UCR) Nash 41361 (ASU); lower part of Willow Canyon Nash 41301, 41313 (ASU); the Gangplank, Nash 41084 (ASU).

Diploschistes muscorum (Scop.) R. Sant. – Parasitic on *Cladonia*, *Leprocaulon*, and *Lepraria xerophila*. Becoming independent, terricolous. Willow Canyon, Knudsen 6966 (UCR).

Dirina catalinariae Hasse – Saxicolous. SE of Willow Canyon, Nash 41257 (ASU); Lester Point, Marsh 7910, Nash 41138 (ASU); lower end of Willow Canyon, Nash 41329, 41340 (ASU); Willow Canyon, Marsh 8018 (ASU); Green Mountain, Nash 41437 (ASU).

Endocarpon loscosii Müll. Arg. – Terricolous. Upper Willow Canyon, Knudsen 6950, 6951 (UCR).

Endocarpon pusillum Hedw. – Terricolous. San Miguel Hill, Knudsen 6701, 6757 (UCR); along airstrip edge near ranger's station, Knudsen 6720 (UCR); Green Mountain, Knudsen 6690 (UCR); Willow Canyon, Knudsen 6967 (UCR).

Evernia prunastri (L.) Ach. – Corticolous. Upper Willow Canyon near fox kennels. Knudsen 6725 (UCR); Green Mountain, Nash 41476 (ASU); lower part of Willow Canyon, Nash 41293 (ASU); San Miguel Hill, Nash 41190 (ASU).

Flavoparmelia caperata (L.) Hale – Corticolous. Slope above SE beach, Nash 41103 (ASU); Green Mountain, Nash 41382, 41479, Marsh 7996 (ASU).

Flavopunctelia flaventior (Sirt.) Hale – Corticolous. San Miguel Hill, Bratt 9035 (SBBG).

Heterodermia leucomela (L.) Poelt – Corticolous. Nidever Canyon, Knudsen 6817 (UCR); campground below ranger's station, Nash 41119 (ASU); San Miguel Hill, Nash 41193 (ASU).

Heterodermia namaquana Brusse – Corticolous. Green Mountain, Knudsen 6749 (UCR); Willow Canyon, Knudsen 6810.1 (UCR); top of bluff above Harford Canyon, Marsh 7995 (ASU); Devil's Knoll, Marsh 7905 (ASU); NW of Green Mountain, Marsh 7974 (ASU).

Hubbsia parishii (Hasse) Tehler, Lohtander, Myllys & Sundin – Saxicolous. Harris Point, Benedict L-47731 (ASU); San Miguel Island, Crayton (ASU); Willow Canyon, Marsh 8030 (ASU); lower end of Willow Canyon, Nash 41339 (ASU); Lester Point, Nash 41150 (ASU); Bay Point, Nash 41353 (ASU).

Lecanactis californica Tuck. – Corticolous. San Miguel Island, Nash 42082 (ASU); lower end of Willow Canyon, Nash 41315 (ASU); Green Mountain, Nash 41411 (ASU).

Lecanactis salicina Zahlbr. – Corticolous. Slope of San Miguel Hill, s/e of ranger's station, Knudsen 6712 (UCR).

Lecania brunonis (Tuck.) Herre – Saxicolous. Willow Canyon, Knudsen 6886, 6914 (UCR); trail to Caldwell Point, Knudsen 6900 (UCR); the Gangplanks, Nash 41096 (ASU); Green Mountain, Nash 41403, 41402, 41386, 41234, 41483 (ASU).

Lecania dudleyi Herre – Terricolous. Willow Canyon, Knudsen 6674 (UCR); Green Mountain, Knudsen 6674 (UCR), Nash 41202 (ASU); San Miguel Hill, Nash 41187, 41113 (ASU); Harris Point, Nash 41176 (ASU); along trail to Harris Point, Nash 41127 (ASU); top of bluff east side of Willow Canyon, Nash 41282 (ASU). The lichenicolous fungus *Toninia subtalprum* v.d. Boom occurs on *L. dudleyi* on Santa Rosa Island and in Baja and is expected on San Miguel Island. *Toninia subdispersa* (Nyl. ex Hasse) K. Knudsen also occurs on *L. dudleyi*.

Lecania fructigena Zahlbr. – Saxicolous. Green Mountain, Knudsen 6693 (UCR), Nash 41232, 41421 (ASU); Willow Canyon, Knudsen 6960.1, 6969 (UCR), Marsh 8017 (ASU) ; Nidever Canyon, Knudsen 6877 (UCR); Harris Point, Nash 41170, 41161, 41421, (ASU); on bluff east of Willow Canyon, Nash 41282 (ASU); long

crest of ridge extending W of Green Mountain (ASU); S side of Green Mountain Nash (ASU).

Lecania inundata (Hepp ex Körb.) M. Mayrhofer – Saxicolous. Along trail to Harris Point, Nash 41128 (ASU).

Lecania naegelii (Hepp) Diederich & v.d. Boom – Corticolous. Lower Willow Canyon, Knudsen 6915 (UCR).

Lecania franciscana (Tuck.) K. Knudsen & Lendemer – Saxicolous. Near ranger's station, Knudsen 6723 (ASU); Nidever Canyon, Knudsen 6820, 6821 (UCR); Green Mountain, Knudsen 6769 (UCR); trail to Caldwell Point, Knudsen 6727 (UCR); Lester Point, Nash 41141 (ASU); along trail to Harris Point, Nash 41132 (ASU). The lichenicolous fungus *Toninia subdispersa* (Nyl. ex Hasse) K. Knudsen, syn. *T. talprum* Timdal, is often found on *Lecania* species. (Knudsen & Lendemer 2007).

Lecania ryaniana v. d. Boom – Saxicolous. Green Mountain, Knudsen 6791.1 (UCR); on trail to Caldwell Point, Knudsen 6732 (UCR). Described from Sandy Point on Santa Rosa Island.

Lecania toninioides Zahlbr. – Terricolous, Saxicolous. Green Mountain, Nash 41458, 41454, 41459 (ASU).

Lecania turicensis (Hepp) Müll. Arg. – Saxicolous. Green Mountain, Nash 41207 (ASU); China Point, Nash 41216 (ASU).

Lecanographa dimelaenoides (Egea & Torrente) Egea & Torrente – Saxicolous. Green Mountain, Nash 41427, 41165, 41182 (ASU); Bay Point, Nash 41354 (ASU); Willow Canyon, Nash 41266 (ASU); Lester Point, Nash 41148 (ASU).

Lecanographa hypothallina (Zahlbr.) Egea & Torrente – Saxicolous. Nidever Canyon, Knudsen 6921 (UCR); Lester Point, Nash 41140 (ASU); Harris Point, Nash 41162 (ASU).

Lecanora caesiorubella Ach. – Corticolous. Green Mountain, Nash 41362 (ASU); campground below ranger's station, Nash 41116 (ASU).

Lecanora californica Brodo – Saxicolous. Green Mountain, Nash 41235, 41387, 41400, 41439, Marsh 7967 (ASU); Willow Canyon, Nash 41259 (ASU); Devil's Knoll, Marsh 7884 (ASU).

Lecanora confusa Almb. – Corticolous. Campground below ranger's station, Nash 41117 (ASU); Green Mountain, Nash 41380(ASU).

Lecanora carneolutescens Nyl. – Corticolous. Green Mountain, Knudsen 6745, 6778 (UCR); San Miguel Hill, Knudsen 6710, 6715 (UCR). This is a sorediate species, often sterile.

Lecanora demosthenesii Lumbsch & Messuti – Corticolous, saxicolous. Green Mountain, Nash 41299 (ASU).

Lecanora dispersa (Pers.) Sommerf. – Saxicolous. China Point, Nash 41215 (ASU); Green Mountain, Nash 41236 (ASU); lower Willow Canyon Nash 41304 (ASU).

Lecanora hagenii (Ach.) Ach. – Usually saxicolous. Green Mountain, Knudsen 6766, 6772, 6680, 6772, 6992 (UCR). Silwa (2007) identified a specimen from Sandy Point on Santa Rosa Island as *Lecanora crenulata* Hook. and it is expected on caliche on San Miguel Island.

Lecanora horiza (Ach.) Linds. – Corticolous. Green Mountain, Nash 41384 (ASU); San Miguel Hill, Nash 42084 (ASU).

Lecanora pacifica Tuck. – Corticolous. Unknown location, Nash 42683 (ASU).

Lecanora zosterae (Ach.) Nyl. – Corticolous. On driftwood, Cuyler Harbor, Knudsen 6894 (UCR).

Lecidea laboriosa Müll. Arg. – Saxicolous. Upper Willow Canyon, Knudsen 6953 (UCR).

Lecidella asema (Nyl.) Knoph & Hertel – Saxicolous, terricolous. Side canyon SE of Willow Canyon, Nash 41261 (ASU).

Lecidella elaeochroma (Ach.) M. Choisy – Corticolous. Green Mountain, Nash 41367 (ASU).

Lepraria xerophila Tønsberg – Terricolous. Trail to Lester Point, Knudsen 6807 (UCR); Nidever Canyon, Knudsen 6807 (UCR), Marsh 8046 (ASU); Green Mountain, Nash 41388, 41453, 41481, 41480 (ASU); San Miguel Hill, Nash 41114 (ASU); lower part of Willow Canyon Nash 41306 (ASU); Harris Point, Nash 41178, 41177 (ASU).

Leprocaulon microscopicum (Vill.) Gams ex D. Hawksw. – Terricolous. Green Mountain, Nash 41480 (ASU).

Mobergia angelica (Stizenb.) H. Mayrhofer & Sheard – Saxicolous, terricolous. Green Mountain, Knudsen 6781, 6801 (UCR), Nash 41420 (ASU); Willow Canyon, Knudsen 6964 (UCR); lower Willow Canyon, Nash 41300 (ASU).

Niebla cephalota (Tuck.) Rundel & Bowler – Corticolous. Near ranger's station, Knudsen 6934.2 (UCR); Green Mountain Nash 41428, 41469, 4147A, Marsh 7985, 7983, 7970 (ASU); Caliche Forest, Marsh 7957, (ASU); Bay Point, Marsh 8037 (ASU); Devil's Knoll, Marsh 7890 (ASU); Lester Point, Marsh 7924 (ASU).

Niebla ceruchis Rundel & Bowler – Corticolous. Near ranger's station, Knudsen 6934.1 (UCR); near fox kennels by Willow Canyon, Knudsen 6884 (UCR); Caliche Forest, Marsh 7958 (ASU); lower part of Willow Canyon, Nash 41288, 41316 (ASU); slope above SE beach, Nash 41106 (ASU); Green Mountain, Nash 41407B, Marsh 7998 (ASU); Lester Point, Nash 41145 (ASU); Cardwell Point, Marsh 8013 (ASU); Green Mountain, Nash 41429 (ASU).

Niebla ceruchoides (Nyl.) Rundel & Bowler – Saxicolous. Willow Canyon, Knudsen 6911 (UCR) Green Mountain, Marsh 7978, Nash 41406, 41444 (ASU).

Niebla combeoides (Nyl.) Rundel & Bowler – Saxicolous. Nidever Canyon, Knudsen 6819.1 (UCR); Harris Point, Nash 41163 (ASU); Bay Point, Nash 41350 (ASU); Green Mountain, Nash 41441 (ASU); lower end Willow Canyon, Nash 41332 (ASU).

Niebla homalea (Ach.) Rundel & Bowler – Usually saxicolous. Between Caldwell Point and Willow Canyon, Knudsen 6905 (UCR);Willow Canyon, Knudsen 6910 (UCR), Nash 41262, 41274 (ASU); lower Willow Canyon Nash 41334, 41333 (ASU); side canyon SE of Willow Canyon; Green Mountain Nash 41442, 41433, 41389, 41405, 41462B (ASU); Devil's Knoll, Marsh 7900 (ASU); Lester Point, Nash 41142 (ASU); 1.6 km S of Bay Point, Grigarick L-53655 (ASU); Harris Point, Nash 41171 (ASU).

Niebla laevigata Bowler & Rundel – Saxicolous. Lester Point, Nash 41144 (ASU); Willow Canyon, Marsh 8020 (ASU); Harris Point, Nash 41173 (ASU).

Niebla procera Rundel & Bowler – Saxicolous. Willow Canyon, Marsh 8024, 8028 (ASU); Devil's Knoll, Marsh 7893, 7895, 7885, 7898 (ASU); Lester Point, Marsh 7927, 7922, 7920, 7892, 7917, 7919, Nash 41143 (ASU); Harris Point,

Nash 41172 (ASU); Green Mountain, Marsh 7979 (ASU).

Niebla robusta (R. Howe) Rundel – Saxicolous. Devil's Knoll, Marsh 7901 (ASU); Willow Canyon, Marsh 8032 (ASU); Bay Point, Marsh 8035 (ASU).

Opegrapha atra Pers. – Corticolous. Lower end of Willow Canyon, Nash 41289, 41317 (ASU).

Opegrapha brattiae Egea & Ertz – Saxicolous. Beach near mouth of Willow Canyon, Knudsen 6920.1 (UCR); N side of Harris Point, Nash 41164 (ASU).

Opegrapha herbarum Mont. – Corticolous, Saxicolous. Near ranger's station, Knudsen 6714 (UCR); Cuyler Harbor, Knudsen 6895 (UCR); Nidever Canyon, Knudsen 6891 (UCR).

Parmotrema hypoleucinum (J. Steiner) Hale – Corticolous. Campground below ranger's station, Nash 41120 (ASU).

Parmotrema perlatum (Hudson) M. Choisy, syn. P. chinense Hale – Corticolous. San Miguel Hill, Knudsen 6784 (UCR), Nash 41191, 41390, 41109 (ASU); near ranger's station, Knudsen 6711 (UCR); Green Mountain, Nash 41471, 41470 (ASU).

Pertusaria brattiae Lumbsch & T.H. Nash – Saxicolous. Willow Canyon, Knudsen 6913 (UCR); Nidever Canyon, Knudsen 6819 (UCR); side canyon SE of Willow Canyon, Nash 41263 (ASU): Green Mountain, Nash 41408, 41240 (ASU); Lester Point, Nash 41146 (ASU).

Pertusaria chiodectonoides Bagl. ex A. Massal. – Saxicolous. Between Caldwell Point and Willow Canyon, Knudsen 6904 (UCR).

Pertusaria flavicunda Tuck. – Saxicolous. Green Mountain, Nash 41410 (ASU).

Pertusaria islandica Bratt, Lumbsch & Schmitt – Saxicolous. Trail between Caldwell Point & Willow Canyon, Knudsen 6906 (UCR); lower Willow Canyon, Nash 41307, 41330 (ASU). (Schmitt, Lumbsch, Bratt 2006).

Pertusaria occidentalis Bratt, Lumbsch & Schmitt – Saxicolous. San Miguel Hill, Knudsen 6787 (UCR). (Schmitt, Lumbsch, Bratt 2006).

Phaeophyscia hirsuta (Mereschk.) Essl. – Corticolous, saxicolous. Green

Mountain, Knudsen 6780 (UCR).

Physcia tenella (Scop.) DC. – Corticolous. Green Mountain, Nash 41472, 41412 (ASU); slope above SE beach, Nash 41107 (ASU); the Gangplanks, Nash 41086 (ASU).

Physconia enteroxantha (Nyl.) Poelt – Corticolous, saxicolous. Lower Willow Canyon, Nash 41308 (ASU).

Physconia isidiigera (Zahlbr. ex Hasse) Essl. – Corticolous, saxicolous. Willow Canyon, Knudsen 6955.1 (UCR).

Pyrrhospora quernea (Dickson) Körb. – Corticolous. Slope above SE beach, Nash 41108 (ASU). The lichenicolous fungus *Skyttea tavaresiae* R. Sant. occurs on this host (Diederich & Etayo 2004).

Ramalina canariensis J. Steiner – Corticolous. Green Mountain, Nash 41430, 41205, Marsh 7994 (ASU); campground below ranger station, Nash 41121, Marsh 7930, 7933 (ASU); Willow Canyon, Marsh 8021 (ASU); (ASU); San Miguel Island, Marsh 7961 (ASU); Bay Point, Marsh 8038 (ASU); Willow Canyon, Nash 41279, Marsh 8021 (ASU).

Ramalina farinacea (L.) Ach. – Corticolous. Green Mountain, Nash 41374, Marsh 7966, 7997 (ASU); the Gangplanks Nash 41087 (ASU); San Miguel Island, Marsh 7960 (ASU).

Ramalina leptocarpha Tuck. – Corticolous. Lower Willow Canyon, Nash 41290, 41320 (ASU).

Ramalina subleptocarpha Rundel & Bowler – Corticolous. Willow Canyon, Knudsen 6947, 6970 (UCR); San Miguel Island, Grigarick L-53656 (ASU); Green Mountain, Nash 41432 (ASU); the Gangplanks, Nash 41088 (ASU).

Rinodina bolanderi H. Magn. – Saxicolous, terricolous. Green Mountain, Nash 41417 (ASU).

Rinodina griseosoralifera Coppins – Corticolous. (Sheard 2004).

Sarcogyne regularis Körb. – Saxicolous. Green Mountain, Knudsen 6777 (UCR).

Schizopelte californica Th. Fr. – Saxicolous. Willow Canyon, Knudsen 6927

(UCR); Willow Canyon, Marsh 8027 (ASU); lower end of Willow Canyon, Nash 41338 ASU); Lester Point, Marsh 7926, 7914, Nash 41151 (ASU); Bay Point, Nash 41355 Marsh 8036 (ASU); Harris Point, 41166 (ASU); Harris Point, Benedict 54B (ASU).

Seirophora californica (Sipman) Fröden – Corticolous. Green Mountain, Knudsen 6785.1 (UCR).

Teloschistes flavicans (Sw.) Norman – Corticolous. Trail between Green Mountain and San Miguel Hill, Bratt 9024 (SBBG).

Tephromela nashii Kalb – Saxicolous. Lower Willow Canyon, Nash 41337 (ASU).

Thelomma mammosum (Hepp in Hartung) A. Massal. – Saxicolous. Green Mountain, Nash 41243 (ASU); Willow Canyon, Nash 41267 (ASU).

Thelomma santessonii Tibell – Saxicolous. Green Mountain, Nash 41242 (ASU).

Toninia aromatica (Sm.) A. Massal. – Terricolous, saxicolous. San Miguel Hill, Knudsen 6698, 6763 (UCR), Nash 41115, 41189, 41223 (ASU); Green Mountain, Knudsen 6676, 6776, (UCR); upper Willow Canyon, Knudsen 6908 (UCR); between Caldwell Point & Willow Canyon, Knudsen 6894 (UCR); China Point, Nash 41210 (ASU); bluff east side of Willow Canyon Nash 41273, 41283 (ASU); Harris Point, Nash 41167 (ASU); Harris Point, Nash 41130 (ASU); Lester Point, Bratt 10458B (ASU).

Toninia nashii Timdal – Parasitic or saxicolous. Green Mountain, Nash 41464 (ASU). This species was described from San Miguel Island based on a single specimen collected by Nash (Timdal 2002). The holotype was missing from ASU and was proabaly not returned to ASU by Timdal. Though described as a crustose lichen, it is possible it is a lichenicolous fungus. I have been unable to collect on any of the islands any specimens that could be idenitified as this species yet.

Toninia sedifolia (Scop.) Timdal – Terricolous. Green Mountain, Knudsen 6675, 6684 (UCR).

Trapeliopsis flexuosa (Fr.) Coppins & P. James – Corticolous and on dead wood. Green Mountain, Nash 41376 (ASU).

Usnea dasaea Stirt. – Corticolous. San Miguel Hill, Nash 41194 (ASU).

Usnea esperantiana Clerc – Corticolous. Green Mountain, Nash 41206 (ASU).

Usnea flavocardia Räsänen – Corticolous. San Miguel Hill, Knudsen 6708 (UCR); Green Mountain, Knudsen 6713 (UCR); upper Willow Canyon, Knudsen 6726.1 (UCR).

Usnea lapponica Vain. – Corticolous. San Miguel Hill, Knudsen 6703, 6753 (UCR); near ranger's station, Knudsen 6935 (UCR); upper Willow Canyon, Knudsen 6726.2 (UCR); Green Mountain, Knudsen 6695 (UCR).

Usnea rubicunda Stirton – Coticolous. Near ranger's station, Knudsen 6713 (UCR); San Miguel Hill, Knudsen 6786.1 (UCR), Nash 1195 (ASU).

Verrucaria calkinsiana Servít – Saxicolous. Green Mountain, Nash 41448 (ASU).

Verrucaria cetera Breuss – Saxicolous. Green Mountain, Nash 41414 (ASU).

Verrucaria floerkeana Dalla Torre & Sarnth – Saxicolous. The Gangplanks, Nash 41098 (ASU).

Verrucaria furfuracea (B. de Lesd.) Breuss – Saxicolous. Between San Miguel Hill and Green Mountain, Knudsen 6702(UCR); Green Mountain, Knudsen 6790, 6791.2 (UCR); trail to Caldwell Point, Knudsen 6728 (UCR). This species is common on caliche, isidiate and rarely fertile

Verrucaria mimicrans Servít – Saxicolous. Near Willow Canyon, Knudsen 6883 (UCR); San Miguel Hill, Knudsen 6755 (UCR); along trail to Harris Point, Nash 41131 (ASU).

Verrucaria muralis Ach. – Saxicolous. Willow Canyon, Knudsen 6968 (UCR); Green Mountain, Knudsen 6752 (UCR), Nash 41450 (ASU); San Miguel Hill, Knudsen 6699 (UCR).

Verrucaria papillosa Ach. – Saxicolous. Near ranger's station, Knudsen 6724 (UCR); Nidever Canyon, Knudsen 6879 (UCR); Green Mountain, Nash 41204, 41203 (ASU).

Verrucaria subdivisa Breuss – Saxicolous. Nidever Canyon, Knudsen 6891 (UCR); Willow Canyon, Knudsen 6990.2, 6962, 6963 (UCR); Green Mountain, Knudsen 6785 (UCR); trail to Caldwell Point, Knudsen 6743 (UCR); Lester Point, Nash 41152 (ASU).

Xanthomendoza oregana (Gyeln.) Søchting, Kärnefelt & Kondr. – Corticolous, saxicolous, terricolous. Green Mountain, Nash 41475 (ASU).

Xanthoria ascendens S. Kondr. – Corticolous. Green Mountain, Nash 41378 (ASU); the Gangplanks, Nash 41091 (ASU).

Xanthoria candelaria (L.) Th. Fries – Corticolous, saxicolous. Trail to Caldwell Point, Knudsen 6729 (UCR); Green Mountain, Knudsen 6687 (UCR), Nash 41415B (ASU); Harris Point Nash 41169A (ASU); S side of Prince Island, Crayton (ASU).

Xanthoria pollinarioides L. Lindblom & D.M. Wright – Corticolous. Caliche Forest, Marsh 7959B (ASU); San Miguel Hill, Nash 41197 (ASU).

CONCLUSIONS

The total diversity number of 141 lichen species is fewer than should be expected, representing less than 10 per cent of the total taxa currently reported from California (Tucker & Ryan 2006). The fog and maritime conditions of the Channel Islands, creating high relative humidity, are ideal for many species of lichen. Though further field work and herbarium studies will increase these numbers, I believe the total number will still be fewer than occurred on San Miguel Island before sheep ranching began in the 1850s.

The sheep ranchers probably depleted the island of large chaparral shrubs by using them for firewood, and sheep grazing would have destroyed many shrub seedlings. Junak et al. (1995) described similar loss of woody vegetation on neighboring Santa Rosa Island due to combined effects of fires and grazing. These effects would have reduced or eliminated shrub substrates and may even have caused the extirpation of some shrubs. This habitat loss is reflected in the subsistence of some lichen species, such as several *Lecanora*, only on fence posts, though they normally occur on the wood of maritime chaparral and oaks. The same habitat loss would have caused the disappearance of some corticolous species and many others are relatively rare now.

Due to depleted seed banks, soil loss, and other long-term effects of grazing, the maritime chaparral will probably never come back. We are not even sure what species and genera were there before the 1850s.

The stripping of the island's vegetation and destruction of biological crusts by sheep eventually led to serious wind erosion. This would have caused the extirpation

of terricolous lichen species, for instance, possibly *Aspicilia glaucopsina* (Nyl. ex Hasse) Hue, *Aspicilia praecrenata* (Nyl. ex Hasse) Hue, *Texosporium sancti-jacobi* (Tuck.) Nádv. ex Tibell & Hofsten as well as the newly-described *Caloplaca obamae* K. Knudsen from Santa Rosa Island (Knudsen 2009).

With the removal of the sheep over forty years ago, some of the native biota on San Miguel Island is recovering. For instance, according to Stephen McCabe (pers. comm.) when Reid Moran visited San Miguel Island in the 1950s, he saw no *Dudleya*. Now *Dudleya greenei* are almost everywhere around the base of San Miguel Hill and I saw populations scattered all over the areas I surveyed. With the resurgence of *Dudleya* species on San Miguel Island there is evidence of the renewed development of biological soil crusts consisting mainly of lichens and cyanobacteria. But the diversity of lichens in biological crusts appears to be low compared to those in undisturbed areas.

For example, *Cladonia nashii* is a terricolous lichen described from Santa Rosa Island where it occurs across the island and pioneers road cuts and covers soil areas where it cannot be trampled by the remaining feral deer and elk. It has wide ecological amplitude and can even be found as far inland in California as the west slope of the San Jacinto Mountains. It is endemic to California from San Simeon to Baja.

During my survey I found a single population of *Cladonia nashii* consisting of five small individual patches on a steep slope of deep soil in upper Willow Canyon. No other *Cladonia* species were found. At least one other *Cladonia* species occurred on the San Miguel Island in the recent past, voucherd by a single Nash collection from Green Mountain that was too scant for positive ID to species (ASU). Based on work at coastal sites in southern California such as Torrey Pines and Point Loma and a continuing studies of Santa Rosa Island and West Anacapa Island, there should be at least four to five species of *Cladonia* on San Miguel Island, including the California endemics *Cladonia hammeri* Ahti and *Cladonia maritima* K. Knudsen & Lendemer (Knudsen & Lendemer 2009).

I have no doubt that the terricolous lichens will continue to recover but I believe that they will be less diverse then they were prior to grazing.

These rather depressing conclusions should not blind us to the beauty of San Miguel's remaining lichens. Or that the island we see now will be very different in a hundred years after we are dead and buried thanks to the policies of the National Park Service to protect and conserve the island's natural resources.

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NOTEWORTHY COLLECTIONS

Calochortus weedii Alph. Wood var. ***intermedius*** F. Ownbey (LILIACEAE) – San Bernardino County: Chino Hills, Chino Hills State Park, Southern California Edison powerline corridor east of Bane Canyon Rd. on Pomona Trail, 7.5' USGS Prado Dam Quad (33°56'25"N, 117°41'50"W; T3S, R8W, W/2 S2), elev. 360 m. (1175 ft.), 22 May 2008, *Scott D. White & Justin M. Wood 12027* (RSA).

Los Angeles County: Brea Canyon, east of 57 Freeway, south of Diamond Bar on Southern California Edison access road, 7.5' USGS Yorba Linda Quad (33°57'36"N, 117°50'59"W; T2S, R9W, NW/4 of S32), elev. 256 m (840 ft.), 28 May 2008, *Justin M. Wood 4* (RSA); San Jose Hills, California State Polytechnic University, Pomona, 7.5' USGS San Dimas Quad (34°03'33"N, 117°49'43"W; T1S, R9W, S28), elev. 283-289 m. (930-950 ft.), 28 May 2008, *Justin M. Wood 5* (RSA); Puente Hills, east of Rose Hills Memorial Park, 7.5' USGS El Monte Quad (34°00'19"N, 118°00'32"W; T2S, R11W, S11), elev. 314-320 m. (1030-1050 ft.), 4 Jun 2008, *Scott D. White & Justin M. Wood 12049* (RSA); Puente Hills, between Turnbull Cyn Rd. and Skyline Dr. on Southern California Edison access road, 7.5' USGS Whittier Quad (33°59'50"N, 118°00'20"W; T2S, R11W, S14), elev. 345 m (1140 ft.), 4 Jun 2008, *Scott D. White & Justin M. Wood 12056* (RSA); Puente Hills, east of Hacienda Blvd. on Skyline Dr., 7.5' USGS La Habra Quad (33°58'24"N, 117°57'07.5"W; T2S, R10W, S29), elev. 384 m. (1260 ft.), 4 Jun 2008, *Scott D. White & Justin M. Wood 12053* (RSA).

Previous knowledge. Calochortus weedii var. *intermedius* (intermediate mariposa lily) is on California Native Plant Society's List 1B.2. It occurs in coastal sage scrub, grassland, and chaparral, generally in openings in shrublands and steep exposed areas of conglomerate sandstone and siltstone. It occurs throughout the lower elevations of the Santa Ana Mountains and the Chino Hills primarily in Orange County, but extending into Riverside County. It has been reported in Los Angeles County (California Native Plant Society On-Line Inventory, *http://northcoastcnps.org/cgi-bin/inv/inventory.cgi*, site accessed 26 Apr 2009) but apparently is unvouchered there (Consortium of California Herbaria, *http://ucjeps.berkeley.edu/consortium/*, site accessed 26 Apr 2009).

Significance. First record for San Bernardino County and a significant expansion of range and number of occurrences in Los Angeles County. We note that *Calochortus weedii* varieties apparently intergrade with *C. plummerae* in some parts of their ranges. The specimens reported here were identified by petal color in living material (darker purple than *C. plummerae* which generally are pink or lavender); fringed petal margins; and yellow hairs surrounding the nectaries.

Ehrharta longiflora Sm. (POACEAE) – Los Angeles County, Puente Hills, City of Hacienda Heights. Southern California Edison powerline corridor near Skyline Dr. and east of Hacienda Blvd., USGS 7.5' La Habra Quad (33°58'N, 117°57'30"W; T2S, R10W, NE/4 S30), elev. 320 m (1050 ft.), 8 May 2008, *Scott D. White & Justin M. Wood 11943* (RSA).

Previous knowledge. Ehrharta longiflora (longflowered veldtgrass) is an invasive annual native to southern Africa. The first California collections were made in San Diego Co. in the early 1990s and in Riverside Co. in 2001. Tom Chester provides photographs; background on local invasions and eradication efforts; and an identification guide online at *http://tchester.org/plants/analysis/ehrharta/longiflora.html* (site accessed 18 Apr 2009).

Significance. First record for Los Angeles County, and about 90 km north of the nearest known occurrence, at Santa Margarita Ecological Preserve, Riverside Co. This occurrence was discovered and identified by Ed Kentner. *Erharta longiflora* was abundant in localized patches along Skyline Dr. between Hacienda Blvd. and Punta del Este Dr. Our collection was along a short access road to a powerline tower, just north of Skyline Dr. Most of the plants had dropped their seeds and turned brown, but intact green specimens were common on north exposures along the road. It was most common on roadsides and open places, partially beneath the canopies of native oaks and ornamental eucalyptus woodland, and also was spreading into the adjacent shrublands. The plants were robust, with stems approaching about 2 m tall. Based on the many plants which had already dropped seeds, it must have produced a copious seed crop, and it is likely to disperse farther via wind, vehicles, or animals.

Euphorbia graminea Jacq. (EUPHORBIACEAE) – Los Angeles County, San Gabriel Valley, City of Monrovia, private residence on El Nido Ave., USGS 7.5' Mt. Wilson Quad (34°09'13"'N, 118°00'48"W; T1N, R11W, SE/4 S22), elev. 171 m (560 ft.), 3 Jan 2009, *Justin M. Wood 281* (RSA), determined by Victor Steinmann.

Previous Knowledge. Euphorbia graminea (grassleaf spurge) is a facultative annual or perennial herb, native from northern Mexico to Colombia and Venezuela. It has spread widely from its native range to numerous locations, including Florida, Louisiana, and very recently, California (Victor Steinmann, pers. comm.). To date, the only two California collections we are aware of were made in 2004 and 2005, in San Diego County (Consortium of California Herbaria, *http://ucjeps.berkeley.edu/consortium/*, site accessed 31 May 2009).

Significance. First record for Los Angeles County, the third record for the state of California, and the northern-most known occurrence. The specimen was collected in an unirrigated area of a yard and was also seen in adjacent yards. The property owner indicated that this occurrence has been persisting there for several years. Based on this collection and descriptions of prior collections in California, *Euphorbia graminea* may be spreading via potted nursery stock. It is probably more common than presently know but may be confined to landscaped areas.

Hemizonia mohavensis Keck (ASTERACEAE) – Riverside County. *Scott D. White 8120* (RSA) and *8123* (RSA, SD), 22 Aug 2000; *Scott D. White 8136* (RSA, UCR), 20 Oct 2000; *Scott D. White 8142* (RSA), 24 Oct 2000; *Scott D. White 11300* (RSA), 27 Apr 2006; *Scott D. White and Justin Wood 11643* (RSA, UCR), 13 Sep 2006. All collected south of Hemet at and around "Gibbel Flat" in the Santa Rosa Hills. USGS Hemet 7.5' quad, ca. 33°42.5' N, 116°56' W; T5S, R1W, Sect. 25, 1800 - 2200 ft. elev. Site topography is rolling hills with scattered granitic outcrops; vegetation is coastal sage scrub, annual grassland, and open riparian shrubland along ephemeral channels. Hundreds of plants, in scattered microhabitat patches mostly along ephemeral channels, often with riparian herbs incl. *Mimulus cardinalis, Stachys ajugoides, Urtica holosericea,* and *Muhlenbergia rigens*. Not found in perennial seeps, but often downstream from seeps where no surface water was present during summer and fall field visits. Absent or uncommon in seemingly suitable habitat where alien grasses and mustards occurred at high density.

Previous knowledge. Synonymous with *Deinandra mohavensis* (Keck) Baldwin (Baldwin 1999. *Novon* 9: 462-471) and treated under that name in the California Department of Fish and Game (2009, Special vascular plants, bryophytes, and lichens list *http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPPlants.pdf*) and in the California Native Plant Society Inventory (*op. cit.*) where it is ranked on List 1B.3. Peninsular ranges, Riverside and San Diego cos. (San Jacinto Mtns., Anza Bench, Palomar Mtns.); historically from northern base of San Bernardino Mtns., San Bernardino Co. Elevational range ca. 2900 - 5200 ft, habitat and distribution summarized by Sanders et al. (1997, *Madrono* 44: 197-203). Also disjunct to southern Sierra Nevada (Kern Co.; Consortium of California Herbaria, *http://ucjeps.berkeley.edu/consortium/*, site accessed 31 May 2009). State-listed endangered since 1981. Presumed extinct until rediscovery in 1994.

Significance. Extends elevational range about 800 feet downward, into areas surrounded by coastal sage scrub rather than the chaparral, oak woodland, or pine forests as otherwise known. Due to its late phenology, *Hemizonia mohavensis* is unlikely to be found during most botanical surveys conducted for compliance with

environmental legislation. The late season surveys on this site were recommended on the basis of the habitat description in Sanders *et al.* (*op. cit.*) and known occurrences higher in the watershed.

Limnanthes gracilis Howell subsp. ***parishii*** (Jepson) Beauch. (LIMNANTHACEAE) – Riverside Co., San Jacinto Mountains, K Flat Meadow, USGS 7.5' Idyllwild Quad (33°41'30"N, 116°40'19.5"W; T5S, R3E, SE/4 S33), elev. 1438 m (4718 ft.), 18 Jun 2008, *Scott D. White & Justin M. Wood 12218* (RSA); May Valley near Fleming Ranch, north of Bonita Vista Rd. and east of Herkey Creek, USGS Idyllwild Quad (33°42'50"N, 116°40'15"W; T5S, R3E, NE/4 S 28), elev. 1550 m (5085 ft.), 20 Jun 2008, *Andrew C. Sanders & Tim Thomas 35537* (UCR).

Previous knowledge. Limnanthes gracilis subsp. *parishii* (Parish's meadowfoam) is listed as endangered under the California Endangered Species Act and is on California Native Plant Society's List 1B.2. It occurs in wet meadows and the edges of ephemeral streams at 600-2000 m elevation in the Cuyamaca and Laguna Mountains (San Diego Co.) and Santa Rosa Plateau (Riverside Co.) (Consortium of California Herbaria, *op. cit.*).

Significance. First records from the San Jacinto Mountains, an eastward range extension of about 55 km from the Santa Rosa Plateau. *Limnanthes gracilis* subsp. *parishii* was not common at either location though field work was near the end of its flowering season at the May Valley site and past flowering at K Flat. Other plants, if present, may have been gone unnoticed. Both sites are on public lands managed by the San Bernardino National Forest for multiple use.

-Justin M. Wood and Scott D. White, Scott White Biological Consulting, 201 North First Ave No. 102, Upland, California, 91786

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